

REMARKS

Claims 42-57 are active in this application.

Applicants respectfully request reconsideration of the application in view of the following remarks.

Applicants wish to thank the Examiner for indicating allowability of Claims 52-55 if rewritten in independent form.

The rejections of the claims under 35 U.S.C. § 103(a) over Gore I in view of Carr and over Gore I in view of Carr and Gore II are respectfully traversed.

It is an object of the present invention to remove organosulfur compounds to a very low level without loosing a substantial amount of the hydrocarbon in the process, see the specification at page 5, line 7 to page 6, line 12. Claim 42 is drawn to reducing the concentration of organosulfur compounds in a hydrocarbon-based fluid.

The present invention as set forth in Claim 42 relates to a process for reducing the concentration of organosulfur compounds in a hydrocarbon-based fluid, comprising contacting said hydrocarbon-based fluid with a first oxidant in a first reactor to obtain a first reactor effluent and contacting a second liquid comprising at least one hydrocarbon with a second oxidant in a second reactor to obtain a second reactor effluent, wherein

- d) said second liquid comprises said first reactor effluent or is obtained from said first reactor effluent by phase separation as a first light phase,

- e) said first and second oxidant comprise a peroxy carboxylic acid obtained by reacting a carboxylic acid with hydrogen peroxide and
- f) said hydrocarbon fluid has a concentration of unoxidized organosulfur compounds that is greater than the concentration of unoxidized organosulfur compounds in said second liquid.

Applicants wish to note that the examiner has not properly determined the scope and content of the Carr reference. The examiner states on page 3, last three lines, of the Office Action “Carr reference discloses a process for reducing the concentration of organosulfur compounds in a hydrocarbon-based fluid”. The examiner further states on page 4, lines 18, to 20 “... since Carr states at Abstract that such a modification would successfully remove mercaptan and non mercaptan sulfur compounds from the hydrocarbon stream”. Both statements are incorrect and in contradiction to the teaching of Carr.

The term “organosulfur compounds” as used in the claims of the application and in the Gore reference is a generic term, which encompasses the mercaptans, the disulfides and the non-mercaptan sulfur compounds mentioned in Carr, see e.g. Gore at column 8, lines 13 to 16.

The Carr reference is directed to the removal of arsenic compounds from light hydrocarbon streams, **but it is not directed** to a removal of organosulfur compounds. To the contrary, **Carr aims at selectively removing arsenic** while retaining the sulfur in the hydrocarbon stream in the form of non-mercaptan organosulfur compounds. This aim is clearly stated in column 1, lines 35 to 43; column 2, lines 13 to 15; as well as in independent claims 1, 19 and 25 of Carr. The Carr process achieves this aim by oxidizing mercaptans,

which are organosulfur compounds, with air to form disulfides, which are non-mercaptan organosulfur compounds, followed by selectively sorbing arsenic without sorbing non-mercaptan sulfur compounds, as clearly described in the abstract of Carr. Carr therefore clearly teaches a process for removal of arsenic compounds from a hydrocarbon stream, where organosulfur compounds are not removed from the hydrocarbon stream, but are maintained in the hydrocarbon stream in the form of non-mercaptan sulfur compounds.

A person skilled in the art, starting out from Gore and trying to improve the removal of organosulfur compounds in the process of Gore, would have no motivation to consider the teachings of Carr, because Carr is not directed to the problem of removing organosulfur compounds from a hydrocarbon, but aims at exactly the opposite, i.e. at not removing the sulfur contained in organosulfur compounds.

Furthermore, Gore clearly teaches that organosulfur compounds have to be oxidized to highly polar sulfones in order to make them amenable to extraction in the process of Gore, see column 5, lines 54 and 55; column 6, lines 55 and 56; and column 8, lines 13 to 23. It is clear to a person skilled in the art, that the disulfides, which are the products of the oxidation taught in Carr, are not highly polar, but have a polarity similar to alkylthiols or dialkyl-sulfides. A person skilled in the art would therefore not expect an improvement in the oxidation of mercaptans to disulfides, as taught in Carr, to contribute to an improvement in the removal of organosulfur compounds in the process of Gore, since Gore clearly teaches, that the organosulfur compounds have to be oxidised to more polar compounds to make them amenable to removal by extraction in the process of Gore. Therefore, even if a person skilled in the art starting out from Gore would consider the Carr reference, he would find the

oxidation of mercaptans to disulfides disclosed in Carr not to be useful in the process of Gore.

Gore and Carr use different oxidants, which provide different products, in order to achieve technical effects which are exactly the opposite of each other. Gore uses oxidants such as perboric acid, persulfuric acid, peroxyacetic acid, dioxirane or ozone to oxidize alkylthiols R-SH to more polar compounds, such as R-SO₂H, in order to remove organosulfur compounds from a hydrocarbon by extraction, whereas Carr uses air to oxidise mercaptans R-SH to disulfides R-S-S-R in order to retain the organosulfur compounds in the hydrocarbon when sorbing arsenic compounds. Since Gore and Carr use different technical means to solve different technical problems, a person skilled in the art would have no motivation from Gore and Carr to apply features of the process of Carr to the process of Gore.

Therefore, the rejections of the claims under 35 U.S.C. § 103(a) over Gore I in view of Carr and over Gore I in view of Carr and Gore II are believed to be unsustainable as the present invention is neither anticipated nor obvious and withdrawal of these rejections is respectfully requested.

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Reply to Office Action of: December 22, 2009

This application presents allowable subject matter, and the Examiner is kindly requested to pass it to issue. Should the Examiner have any questions regarding the claims or otherwise wish to discuss this case, he is kindly invited to contact Applicants' below-signed representative, who would be happy to provide any assistance deemed necessary in speeding this application to allowance.

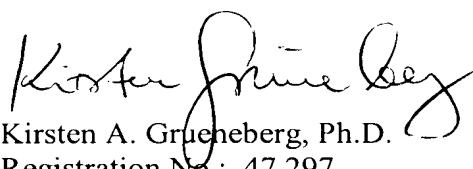
Respectfully submitted,

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